Sample EMC Quality Manual

DOCUMENT IDENTIFIER: A-DG-ELEN103-00-0000 Rev A, 03-Mar-1992

ABSTRACT: This document is a sample EMC quality manual to be used as a guide with DEC STD 203-0 General Requirements for Technical Evaluation Laboratories.

APPLICABILITY: This manual is to be used as a guide by laboratories preparing a quality manual for their operation.

STATUS: APPROVED 03-Mar-1992; use VTX SMC for current status.

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REVISION HISTORY:	No previous revision exists.
Document Management Category:	Test Laboratories (HTL)
Responsible Department:	EMC Domain Office
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APPROVAL: This document has been reviewed and approved by the General Review group for its category.

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1 INTRODUCTION

This manual describes the Electromagnetic Compatibility (EMC) Quality process to be used by all Digital Equipment Corporation EMC organizations.

2 PURPOSE

This manual documents Digital Equipment Corporation EMC Quality System.

3 SCOPE OF THE MANUAL

These quality practices are applicable to all Digital EMC test facilities.

4 MANAGEMENT OF THE MANUAL

The EMC Domain Office is responsible for updating, producing, and distributing this manual. The EMC Domain will meet quarterly with the facilities managers to review quality assurance policies and management procedures. The EMC Domain Office will work with facilities managers to ensure the implementation of and adherence to the Digital EMC Quality System. The EMC Domain membership owns the responsibility of ensurilng that all instructions, standards, operating manuals, and reference data is maintained and up to date.

The manual and subsequent revisions will be circulated to each associate for review and comment. All associates are responsible to inform the EMC Domain Office about changes in practices and procedures that affect the contents of this manual or the assurance of quality in their work area.

This manual will be placed under Digital EMC document control and copies will be kept by all site managers, the EMC Domain Office, the Engineer-in-Charge, and Administrator-in-Charge at each facility. All facility personnel should know where the official, updated manuals are kept, and refer to them as needed. Revisions will be dated, and as they occur, updated copies will be forwarded to each manual holder.

5 DEFINITIONS AND TERMINOLOGY

CEN/CENELEC—The joint European Standards Institution made up of members of the national standards organizations and national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Digital—Digital Equipment Corporation. Headquarters, Maynard Massachusetts.

EMC—Electromagnetic Compatibility. The ability of an electronic device to operate in its intended electromagnetic environment without suffering or causing unacceptable degradation because of electromagnetic radiation or responses.

EMI—Electromagnetic Interference. Degradation of the performance of a device, equipment, or system caused by an electromagnetic disturbance.

FCC—Federal Communications Commission. United States governmental agency responsible for control of electromagnetic spectrum from electronic equipment.

Manual—Refers to this Digital *EMC Quality Manual* which prescribes procedures to be followed by Digital EMC facilities to ensure a consistent quality system.

NIST—National Institute of Standards and Technology, United States Department of Commerce.

NVLAP—National Voluntary Laboratory Accreditation Program. This program accredits laboratories meeting the specifications set forth by the National Institute of Standards and Technology (NIST), United States Department of Commerce.

VCCI—Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines. A Japanese organization that has established voluntary standards controlling electromagnetic emissions allowed by electronic equipment.

VDE—Verband Deutscher Elektrotechniker. This testing and certification agency is authorized by the German Government to perform testing for Class A equipment marketed in Germany.

6 DIGITAL EMC QUALITY POLICY

Digital EMC testing facilities test information technology products for conformance to EMI standards worldwide. The EMC test facilities plan to achieve and sustain quality conformance testing so that the equipment under test (EUT) meets the requirements of Digital Equipment Corporation, external customers, and the accreditation body.

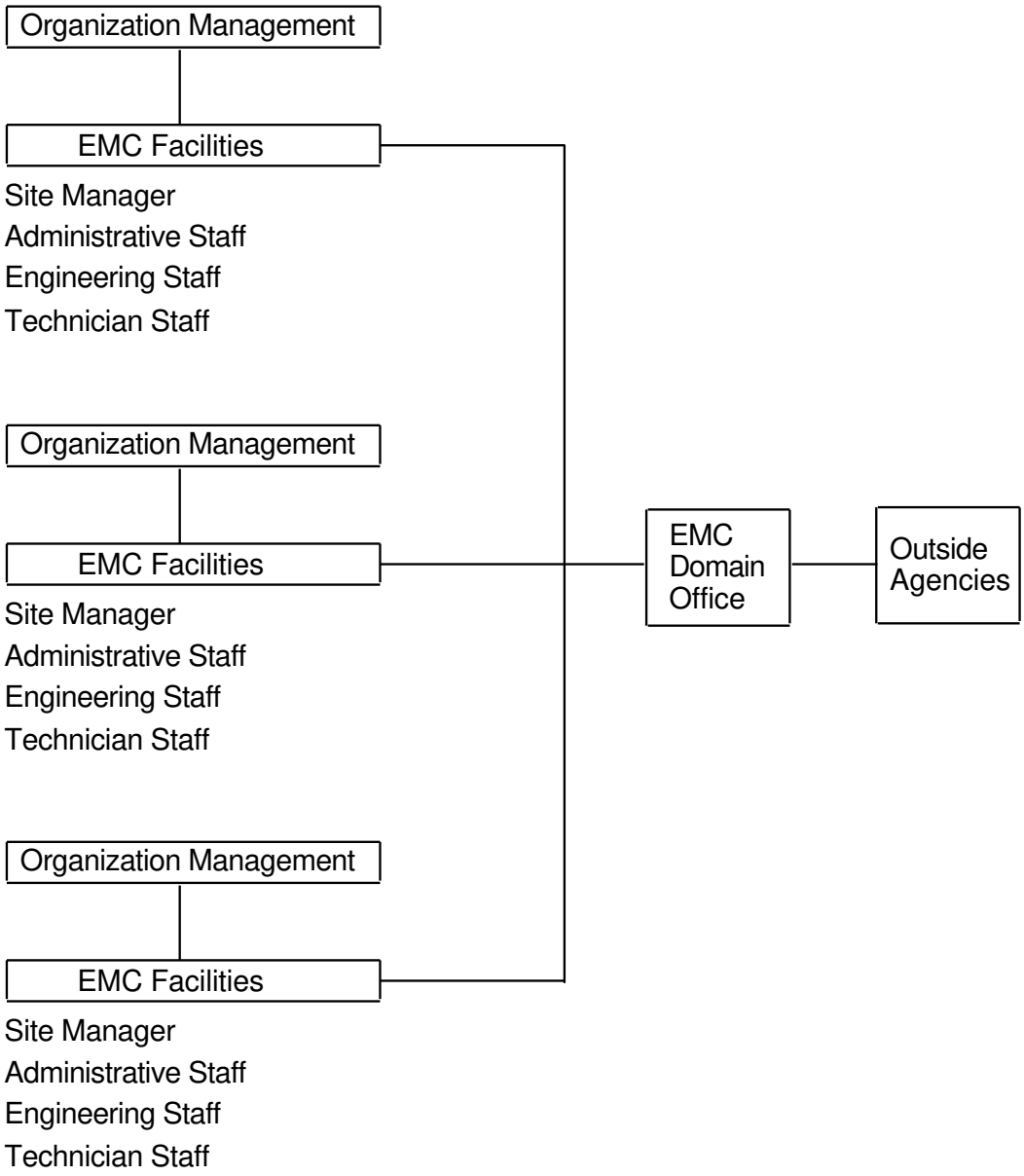
The EMC test facilities are to achieve the following objectives:

- Conformance testing process complies with *ISO/IEC Guide 25 General requirements for the competence of calibration and testing laboratories*.
- Testing produces reliable and repeatable results.
- Analysis of test results produces accurate test verdicts.
- Original test data records, observations, and results are secure and reproducible.

7 DIGITAL EMC ORGANIZATION

Figure 1 shows the Digital EMC organization.

Figure 1: EMC Organization Diagram



7.1 ORGANIZATION RESPONSIBILITIES

7.1.1 EMC Domain Office

- Maintains EMC product status
- Interfaces with outside agencies and industry organizations with respect to EMC matters
- Organizes EMC engineering and testing support in Digital
- Arbitrates significant EMC-related issues between EMC groups and engineering groups

7.1.2 EMC Groups

EMC groups in Digital are organizations, or parts of organizations, that are specifically chartered to provide EMC design, test, and consultation services to one or more product design groups. The EMC groups provide the design and testing expertise for the design and in-system testing of Digital products to ensure compliance to internal Digital standards as well as the requirements of outside agencies.

7.1.3 Facility Signatory

The site manager is the signatory for the test facility. If the manager is not available, signatory duties are to be assumed by an identified alternate.

7.1.4 Technical Signatory

Final sign-off of test reports for technical accuracy is the responsibility of assigned EMC Domain Engineers. These Principal EMC Domain Engineers are lead or senior engineers of specific EMC groups designated to review and sign product test reports. They provide a technical review of the test results to regulatory requirements and evaluate results based on their knowledge of the requirements, the product, and the test facility. The acceptance of a product's test report by a designated Principal EMC Domain Engineer is mandatory for product announcement or release.

7.2 DIRECTORY OF LABORATORIES AND HEADQUARTERS

Digital Equipment Corporation Headquarters
146 Main Street
Maynard, Massachusetts 01754-2571
(EMC Domain Office)
Mail Stop: MLO6-1/U30

Marlboro EMC Test Facilities
200 Forest Street
Marlboro, Massachusetts 01752-3011
(Technical Support Group)
Mail Stop: MRO1-A
(One EMC-free field-test facility—two large shielded chambers and one large anechoic chamber)

Marlboro EMC Test Facilities
200 Forest Street
Marlboro, Massachusetts 01752-3011
(USS/DES)
Mail Stop: MRO1-D
(Three EMC-free field-test facilities—one large and one small anechoic chambers)

Salem EMC Test Facility
9 Northeastern Boulevard
Salem, New Hampshire 03079-1994
(VSS/SPE)
Mail Stop: NIO/A2
(One EMC-free field-test facility—one large anechoic chamber)

Colorado Springs EMC Test Facility
301 Rockrimmon Boulevard South
Colorado Springs, Colorado 80919-2398
(Storage Systems—West)
Mail Stop: CXO1-1/N15
(One EMC-free field-test facility—one small anechoic chamber)

Shrewsbury EMC Test Facility
333 South Street
Shrewsbury, Massachusetts 01545-4112
(Storage Systems—East)
Mail Stop: SHR1-3/E19
(One EMC-free field-test facility)

7.3 FIELDS OF ACTIVITY

Digital Equipment Corporation is a designer, supplier, integrator, and manufacturer of information technology products for worldwide distribution.

The EMC organizations are responsible for assuring that all products meet the mandatory governmental EMC requirements necessary for worldwide distribution as well as internal company requirements.

Table 1: Country/Regional Specific Documents

Applicable Documents	Country
AS3548-1988	Australia
CSA 108.8	Canada
DBP Directive 523/69	Germany
DBP Directive 1046/84	Germany
Directive 89/336/EEC	European Economic Community
EN55022	European Economic Community
FCC Rules, Part 15	United States
VCCI level 0	Japan
VDE 0871	Germany
VDE 0875	Germany
VDE 0877	Germany

Table 2: Standards

Document Number	Subject
ANSI C63.4	*Methods of Measurement of Radio Noise Emissions*
CISPR-22	*Limits and Methods of Radio Interference Characteristics of Information Technology Equipment*
DEC STD 103-0	*Digital Equipment Corporation Internal Standard on Electromagnetic Compatibility*
DEC STD 203-0	*General Requirements for Technical Evaluation Laboratories* (Includes ISO/IEC Guide 25)
ISO/IEC GUIDE 45	*Guidelines for the Presentation of Test Reports*

8 PERSONNEL

The following segment lists the responsibilities of the personnel who staff EMC facilities.

8.1 EMC TEST FACILITIES MANAGER

a. Supervise lab facilities and other members of the staff
   - Coordinate staffing and training needs to meet customer test requirements

b. Develop future facilities and staff to handle future customer needs for development and compliance testing

- Understand customers' present and future requirements so proper test beds, resources, and equipment will be available
- Stay abreast of trends in EMC

c. Supervise quality activities to improve customer satisfaction with all aspects of services

- Ensure that processes and procedures are accurate, efficient, and serve the needs of customers
- Ensure that all personnel have the proper training for current duties, and develop training plans for future assignments

d. Interface with Digital EMC Domain Office

- Stay abreast of new regulations and procedures.
- Maintain contact and communication with external agencies

8.2 EMC ENGINEER-IN-CHARGE

a. Maintain the highest quality in workmanship and maintenance of the laboratory

- Follow and implement quality assurance practices and procedures as written in the Quality manual.
- Ensure that proper site signal attenuation and site uncertainty measurements are conducted periodically to ensure that the site remains in compliance. Ensure antenna calibration is conducted as required.

b. Review test procedures and test plans for each test performed prior to the test date

- Evaluate test equipment requirements based on availability, function, and calibration status.
- Determine and evaluate technical support required to conduct testing.
- Review test setups and procedures with the test technician prior to test date.

c. Oversee tests for proper setup and adherence to test procedures

- Maintain a test log that will note the test date(s), test method, the name(s) of the customer, attending customer representatives, test technician, engineer, and include a summary of test results.
- Evaluate *fixes* if troubleshooting is required.
- Evaluate and record departures from standard test specifications and procedures, such as additions, deletions, or deviations.

d. Evaluate the need for repair and calibration of test equipment based on performance reports and calibration status reports from technicians

- Designate equipment to be released for calibration based on test schedule and calibration due dates.
- Participate in the site calibration and documentation of results.

e. Write, review, and sign all test reports for tests conducted under the engineer's supervision to ensure accuracy and clarity

- Ensure that all test reports explain departures from standard test methods, procedures, or specifications.
- Ensure that test reports conform to the Digital standard report format that includes information required by customers and government agencies.
- Identify tests not covered by agency accreditation, NVLAP for example, and specify these tests in the test report.

f. Maintain engineers' level of competency according to Digital's EMC training requirements

- Stay abreast of current trends in both instrumentation and technology in the EMI field. To comply with changing regulations, recommend new test equipment and develop new test processes that are more accurate, efficient, and better serve the customer.
- Read current EMI applicable technical journals and articles. Attend continuing-education EMI seminars when possible.

g. Participate in competency training and evaluation of technicians as requested

- Disseminate technical information as appropriate

h. Interface with EMC Domain Office on new regulations and standards

8.3 TEST ENGINEER

a. Oversee and maintain the highest quality of workmanship in testing assignments

b. Review Test Procedure or Test Plan with test technician prior to or during a test

c. Oversee tests for proper setup and adherence to test procedures

- Sign the test log that will note the test date(s), test method, the names of the customer, customer representatives or requester, test technician, test engineer, and include a summary of the test results.
- Evaluate *fixes* if troubleshooting is required.
- Evaluate and record departures such as additions, deletions, or deviations from standard test specifications and procedures.

d. Write clear, concise, and accurate test reports on assigned tests, or review and sign test reports that have been written by a test technician

8.4 EMC TECHNICIAN

a. Maintain the highest quality of workmanship in testing and laboratory maintenance

- Follow quality assurance procedures as written in the quality manual
- Follow Digital Equipment Corporation EMC test procedures and test methods as written in the *Laboratory Procedures Manual*

b. Maintain the highest level of competency and proficiency based on experience and training
   - Participate in internal and external opportunities for continuing education
   - Attend and participate in scheduled in-house technical meetings

c. Assure that all equipment selected for use in testing is functioning properly and in calibration
   - Check calibration dates on all equipment and record "cal due" dates on test equipment lists
   - Report immediately any malfunctioning or out-of-calibration equipment to the engineer in charge
   - Perform daily calibrations on spectrum analyzers and receivers; record completion on the equipment list

d. Prepare for test assignments by reviewing test plans and specifications with the engineer in charge prior to start of test
   - Implement and document deviations from the test plans or standard test methods as designated by the engineer in charge on data sheets
   - Record, sign, and date all data completely and accurately on the standard data sheets

e. Write, review, and sign test reports as assigned by the engineer in charge, according to standards of accuracy and clarity

8.5 ADMINISTRATION

Administrative personnel are responsible to:

- Maintain schedule for all site activity.
- Interface with the customer and describe the requirements for testing hardware and software prior to test date. Provide documentation for all devices under test.
- Prepare documentation such as VDE, FCC, and Digital EMC submittal packages.
- Ensure all site attenuation data is kept on file according to legal specifications. Maintain a data base for calibration records.
- Provide cost estimates to customers for projected work.
- Negotiate contracts with the customers.
- Ensure proper billing of hours to products.
- Assist with the logistics of site activity and the shipment of products.
- Review documentation packages for completeness before release.

9 TRAINING PROGRAM

9.1 TRAINING POLICY

One of Digital's most valuable assets is its people. A highly competent and trained staff is essential for success in any technical discipline. Digital offers the following training incentives to all employees:

- Tuition refunds for undergraduate and graduate degrees
- Internal seminars and courses in technical fields
- External seminars and courses in technical fields

Proper training and qualifications for the EMC test facility staff is important to Digital and the EMC Domain. The EMC test facility staff will participate in any required training.

9.2 MANAGEMENT

a. The EMC Domain Office and facilities managers oversee and coordinate training programs for the technical and administrative staffs.

b. The engineer in charge of each facility is responsible for providing the appropriate initial and ongoing technical training experience for the site technical personnel.

   The facility manager is responsible for providing the appropriate nontechnical training experience for administrative site personnel, as well as administrative training for the technical staffs. This training might involve the assignment of an individual to handle these tasks.

9.3 INITIAL TRAINING

a. New personnel will go through a standard training program to gain the basic administrative and technical skills necessary for the performance of their jobs.

b. New personnel orientation is assigned by the facility manager based on the position being filled.

c. Orientation will include the following:

   - Use of the facility's telephone system
   - Medical emergency procedures
   - Emergency evacuation procedures for the facility
   - Security system for the facility
   - Digital *EMC Quality Manual*
   - Digital's *Personnel Policies and Procedures Manual*
   - *EMC Facilities Operation Manual*
   - *EMC Procedures Manual*
   - Job-specific procedures
   - Use of required computer systems

9.4 ONGOING TRAINING

The appropriate personnel will attend ongoing training for facility personnel as follows:

a. Individual technical and administrative personnel educational and training levels or needs are to be reviewed between the facility manager and the individual in a one-on-one meeting at six months and one year intervals, then annually thereafter. The individual proficiency record is updated at this time.

b. Plans for ongoing education, seminars, or training experiences are determined at the one-on-one meetings and documented.

c. Technical meetings are held on a quarterly basis as a minimum. The entire technical staff is assembled to discuss improvements in procedures, equipment updates, and quality-related technical issues.

10 PERIODIC REVIEW OF QUALITY SYSTEM

10.1 INTERNAL AUDITS

a. An in-house self-inspection (audit) will be performed once a year to assure that all activities comply with the requirements of the quality system.

b. Inspections will be performed according to the Digital EMC Audit Procedure.

c. All findings from the internal audit will be documented, and corrective actions that arise from the audit will be documented.

10.2 EXTERNAL AUDITS

a. External audits by customers and accrediting agencies will be coordinated by the facility manager and the EMC Domain Office. Results of all external audits and corrective actions to any deficiencies will be documented.

b. Each year the EMC Domain Office and the site facility managers will evaluate and update the quality assurance manual to ensure the quality system described is appropriate and effective. The evaluation will be based on corrective actions and documentation of the annual self-inspections and any external audits which indicate the need for changes to the quality manual.

c. Equipment calibration procedure and inspections of the equipment calibration reports will be conducted biannually to ensure compliance to Digital EMC requirements.

11 CALIBRATION OF TEST AND MEASUREMENT EQUIPMENT

11.1 CALIBRATION CONTROL

1. The facility manager will designate an individual to be responsible for that facility's test equipment calibration control.

2. An equipment list with current *Last Calibration Date* and *Calibration Due Date* for each item requiring calibration will be maintained by the designated individual at each facility.

3. By the first day of each month, all equipment that is due for calibration within the next 30 days will be tagged. If the equipment has not been calibrated by the end of the 30 days, it will be physically removed from service until calibration is complete.
4. The individual designated for equipment calibration will be responsible for the movement of equipment to and from the facility for calibration. This movement entails sending the proper paperwork with the equipment and receiving back the proper calibration certifications from the organization doing the calibrations.
5. All calibration certifications are to be kept filed for examination and audit purposes.
6. The facility's test equipment data base used for report generation is to be updated as soon as equipment calibration status changes.
7. In the event a piece of equipment that had been in service and sent for normal calibration is diagnosed as being received in an out-of-specification condition by the calibration service, the engineer in charge will, based on the equipment problem, evaluate the impact on test results taken with the failing test equipment.
8. As part of the overall calibration system, a historical profile will be kept by each owning organization on each item of test equipment as identified by its serial and model number.

11.2 CALIBRATION CYCLES

1. The timing recommendations of the original equipment will be followed unless operating experience has proven a shorter calibration cycle is necessary.
2. For test equipment that has no published recommended calibration cycle, the timing interval will be one year between periodic calibrations unless out-of-tolerance reports indicate more frequent calibrations are necessary.
3. Two consistent out-of-tolerance reports will indicate additional investigation and repair. If no cause is determined and no repair is indicated, the equipment will be returned for use and the calibration interval will be cut to half its regular cycle. When two consistent in-tolerance reports are received, the piece of equipment will resume its normal scheduled calibration cycle.
4. Test equipment that is not used in normal facility operation can be removed from its normal calibration cycle, but will be identified by a red tag and labeled **CALIBRATION REQUIRED BEFORE USE**.
5. The free field test range is considered a piece of test equipment and falls into the required yearly calibration cycle, as do antennas.

11.3 CALIBRATION CERTIFICATES

Statements of calibration certification shall contain as a minimum:

1. Description or identification of the test equipment, including manufacturer, model number, and serial number
2. Date of calibration
3. Calibration results or out-of-tolerance conditions
4. Report or certificate number

5. Environmental conditions at time of calibration
6. Statement of traceability to national standards
7. List of test equipment used and their calibration dates or traceability numbers

11.4 CALIBRATION INFORMATION

An equipment evaluation is supplied in addition to the calibration certificates. This evaluation will state the technical parameters of the equipment as received prior to calibration and after calibration.

11.5 CALIBRATION EQUIPMENT LABELS

Test equipment shall be labeled to ensure adherence to calibration schedules. The label shall indicate date of last calibration, by whom calibrated, and when the next calibration is due.

11.6 PERFORMANCE CHECKS

1. Daily performance checks of test equipment must be done according to manufacturers specifications or facility procedures.
2. Site technical personnel will routinely inspect coaxial cables and connectors for signs of wear or abuse and proper operation according to facility operation procedures.
3. Documentation of daily and monthly performance checks or calibrations will be recorded by the operators of the equipment, and periodically checked by the test engineer for trends, shifts, or irregularities.

12 SHIPPING AND HANDLING OF EQUIPMENT

12.1 GENERAL

All equipment, the customer's as well as the facility's, will be handled and stored with care to prevent dropping or undue jarring. While the customer is on location, the equipment under test will be under the customer's supervision at all times unless prior arrangements have been made.

12.2 INCOMING SHIPMENTS—LARGE HARDWARE

12.2.1 Receipt and Log-In Procedures

1. The customer is responsible for ensuring that equipment to arrives at the test facility by the scheduled test time.
2. A shipping log that details dates of arrival, departure, mode of transportation, weight, and any special instructions is maintained by the test facility. All incoming shipping documents will be kept and filed.

12.2.2 Storage of Customer's Equipment

Equipment awaiting testing will be kept in a designated location to ensure security and safety.

12.3 INCOMING EQUIPMENT—SMALL SCALE - HAND CARRIED

1. The customer is responsible for bringing small, hand-carried equipment to the test facility on or before the scheduled test date. The technical personnel assigned to the test will assist the customer in unloading equipment for test, and transfer the equipment to an appropriate area.
2. The equipment is to be logged identifying how the equipment arrived and the person responsible for bringing it.
3. The customer is requested to set up the equipment under test, bring it to its typical operating conditions, and remain during the testing.
4. Upon completion of the test, the customer's equipment will be logged out and returned to the customer's vehicle in the same fashion it was brought in, unless prior arrangements have been made.

12.4 RETURN SHIPMENTS OF CUSTOMER EQUIPMENT

If the customer's equipment is to be returned through shipping, the test technician and customer will package the equipment for shipment, and then make shipping arrangements.

12.5 DAMAGED EQUIPMENT

1. If a customer's equipment is damaged or destroyed while at the test facility, the site Manager is to be notified immediately.
2. All personnel involved with the damaged equipment are to be interviewed and statements taken.
3. Photographs of the damaged equipment are to be taken for insurance purposes.
4. A damage report is to be generated and submitted to the facility manager to include the following:
   - Customer name
   - Description of equipment
   - Model numbers
   - Serial numbers
   - Personnel statements
5. The customer is to be notified if not present at the time the equipment was damaged.
6. Corporate Insurance is to be notified and the proper forms completed.
7. The equipment is not to be removed from the facility until Corporate advises of its disposition.

13 PURCHASING AND HANDLING OF FACILITY EQUIPMENT

13.1 HANDLING AND REPAIRS

1. All personnel are responsible for handling equipment with appropriate care to ensure safety from accident or personal injury and to prevent damage to the equipment.
2. All technical personnel are instructed to advise the engineer-in-charge of the respective facility in the event that test and measurement equipment is in need of repair. Office equipment in need of repair should be reported to the facility manager.
3. Repair of equipment should be handled immediately to provide the least amount of downtime of daily work tasks.
4. All maintenance work is documented accurately in files on each piece of equipment that has been repaired. All in-house and out-of-house test equipment repair and maintenance should be described on a maintenance form, and recorded in the historical profile book. Nontest equipment records are kept in the equipment folders.

13.2 PURCHASE OF EQUIPMENT

1. Equipment is to be purchased according to Digital purchasing policies using the prescribed processes and forms.
2. Equipment with unique requirements or specifications will be proof tested prior to ordering.
3. In cases where several pieces of a specific type of test equipment is required, the EMC Domain Office will generate a corporate purchase specification.

13.3 LEASED OR BORROWED EQUIPMENT

1. Leased or borrowed test equipment is subject to the same quality standards as Digital's own test equipment with verifiable records of calibration with appropriate shipping and handling to assure proper performance and reliable test results.
2. Leased or borrowed test equipment is to be checked by the engineer-in charge immediately upon arrival to ensure that it is in proper operating condition before it is used for any testing.
3. Leased or borrowed office equipment is to be handled and maintained properly so as to be returned to the owner in good operating condition.

14 SUBCONTRACTING

1. In the event that Digital lacks the equipment or capacity to complete or provide a certain test, Digital may subcontract another facility or facility's equipment to provide the necessary testing.
2. When subcontracting another facility to perform testing, Digital must perform a quality audit of the facility before testing commences. This quality audit, at a minimum, will consist of a visit to the facility and require inspection of calibration data on the facility and the equipment.

3. All test results taken at the subcontracting facility must be clearly defined in the final test report or documentation.

15 PROFICIENCY TESTING

15.1 ACCEPTANCE OF TEST SAMPLES

1. Digital will accept samples for proficiency testing as required by accreditation bodies.
2. Participation in all other proficiency testing will be authorized by the facility manager and coordinated through the EMC Domain Office.

15.2 HANDLING AND TESTING OF TEST SAMPLES

Test samples will be treated and tested as if they were a regular customer's sample.

1. Acceptance memo will be sent to device sender.
2. Tests will be scheduled and logged as a normal customer.
3. Technician assignments to test a sample will be random, based upon proven competency only. Engineering support will be limited to an as-needed basis.
4. Routine test equipment will be used.
5. Routine data collection will be performed.
6. Test report will be written using standard test report format (or agency requirements).

16 TECHNICAL TEST PROCEDURES

1. All test methods used by Digital technical staff will be written and approved procedures that detail specific methodologies, setups, equipment options, and quality control requirements. These procedures are to ensure consistency in precision and reliability between laboratories and technical personnel.
2. All Digital test procedures are written by technically qualified personnel using nationally and internationally accepted standards for references and are reviewed and agreed to by the Digital EMC Technical Group (EMCTG).
3. All Digital test procedures will be marked with revision dates and will be reviewed by the EMCTG as required by changing national or international standards, with a maximum of three years between reviews.
4. All technical personnel will have access to current test procedures for reference during testing.
5. Historical files of previously used methods are available in the EMC Domain Office.
6. Choice of test procedures is determined by the standard used to test the equipment, if more than one procedure for a particular test is available.
7. Requests for deviation from the standard Digital test procedure requires technical personnel to advise of unsound procedures and document them accordingly.

17 DEVIATIONS AND DEPARTURES FROM TEST PROCEDURES

1. Departures or deviations from the standard test procedure must be approved by the engineer-in-charge and will be appropriately documented in the test log and data sheets and retained in the test file.
2. The deviation will be explained to the customer before testing commences.
3. Test reports will include, as applicable: deviations, additions, and departures from the standard test procedures.

18 TESTING AND TEST REPORTS

18.1 TEST PERSONNEL

1. Testing is performed by a trained EMC technician and an EMC engineer.
2. The technician will be responsible for calibrating and operating the receivers, spectrum analyzers, and other required equipment in accordance with the manufacturer's instruction manuals or Digital's operating procedures.

18.2 CONFIDENTIALITY AND SECURITY

The EMC test facilities will meet security standards specified in *DEC-STD 128-0 Security Classifications for Engineering Intellectual Property — Policy and Regulations*.

The test facilities will also meet any requirements of the accreditation body.

18.3 COLLECTION AND RETENTION OF TEST DATA

1. Technicians and Engineers are responsible for the data taken during testing on their assigned programs.
2. The original data sheets will be maintained in a product file at the testing facility.
3. All test documentation, data, photos, and calculations will be retained according to the published schedules in the *Digital Record and Information Management Manual* and comply with *Corporate Finance and Reporting Policy 301-09*, or outside government requirements, whichever are longer.

18.4 TEST REPORTS

1. The test report will document the results of the testing in a manner consistent with government and corporate requirements.
2. Technical and administrative personnel involved in final report writing will follow the approved Digital EMC report writing procedure number EM-Y3121-00.
3. Three copies of the final report will be reviewed and signed by the responsible EMC engineer, the person who wrote the report, and the engineer-in-charge.
4. The three copies of the report are then forwarded to the product manager (customer) for signature.

5. The three copies are then distributed as follows:
   - One copy goes to the product manager (customer).
   - One copy is forwarded to the EMC Domain Office.
   - One copy is kept at the test facility.
6. Documentation turnaround should not exceed 15 days.

19 QUALITY PROBLEMS AND CORRECTIVE ACTION

19.1 FEEDBACK EVALUATION SYSTEM

1. All customers are sent an evaluation form from the testing facility after completion of their test and report.
2. Results of the customer evaluation will be reviewed by the facility managers and the EMC Domain Office.
3. Results will be published quarterly and posted in all facilities.

19.2 CORRECTIVE ACTION

1. The facility managers and the EMC Domain Office will conduct follow ups to specific feedback indicating below average evaluation from customers.
2. Consistently low scores (low to below) in any one area of evaluation will be subject to system analysis for corrective action by the facility managers and the EMC Domain Office.
3. All corrective action will be properly documented.

20 REFERENCE MATERIALS

Digital technical staff shall use the following documents as reference material:

1. *U.S. Code Of Federal Regulations 47 Parts 0 To 19 (Telecommunication)*
2. *VDE 0877 Parts 1 and 2 Test Procedures*
3. *ANSI C63.4 Methods of Measurement of Radio-Noise Emissions*
4. *IEC 801-2 Electrostatic Discharge*
5. *IEC 801-4 Electrical Fast Transient Noise*
6. *IEC 801-5 Surge on Power and I/O Lines*
7. *CISPR-22 Limits and Methods of Radio Interference Characteristics of Information Technology Equipment*
8. *ISO/IEC Guide 45 Guidelines for the Presentation of Test Reports*
9. *DEC STD 103 Digital Equipment Corporation Internal Standard on Electromagnetic Compatibility*

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